INVESTIGATOR'S ANNUAL REPORT

National Park Service

All or some of the information provided may be available to the public

Reporting Year: 1991	**Park:** Shenandoah NP
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Permit#:
SHEN1991ABAK

Park-assigned Study Id. #:
unknown

Project Title:
Occurrence and severity of ozone injury on sensitive hardwood species in selected eastern National Parks

Permit Start Date: Jan 01, 1998	**Permit Expiration Date** Jan 01, 1998
Study Start Date: Jan 01, 1991	**Study End Date** Jan 01, 1993

Study Status:
Completed

Activity Type:
Other

Subject/Discipline:
Air Quality

Objectives:

1. Evaluation of ozone sensitive species with Trend Plots established peripheral to the three existing ozone monitoring stations within the SNP. These plots were to be established during August and early September; concomittant 1991 seasonal ozone monitoring data remains yet to be obtained for analysis of exposure response. ;2. Provide expertise at the National Park Service sponsered Training Workshop at Gatlinberg, TN (August 12-16, 1991). Expertise was added to this successful meeting for developing of survey techniques for ozone injury.

Findings and Status:

Ozone symptoms were manifested as stipple (pigmented lesions) which were usually reddish purple to black and on the adaxial surface of the leaf. Of the black cherry, 12 of 30 trees (40%),;52 of 60 trees (87%) and 2 of 30 trees (7%) were found to be symptomatic at Dickey Ridge, Big Meadows and Sawmill Run, respectively. The yellow poplar exhibited 19 of 30 trees (63%) and 20 of 30 trees (67%) as symptomatic at Dickey Ridge and Sawmill Run, respectively. Of the white ash observed, 13 of 30 trees (43%) and 19 of 30 trees (63%) were symptomatic at Dickey Ridge and Big Meadows. Of the five sassafras trees, 40% sampled at Sawmill Run were symptomatic. Density and transparency estimates may be found in Table 4 for each species at the respective sites. Further analysis will be neccessary before detailed conclusions can be drawn. Overall comparisons between asymptomatic and symptomatic trees for transparencies do not appear as related to ozone induced defoliations. However, later season evidenced defoliation and transparency interaction on ozone sensitive trees.;The three species differed in their distribution of ozone symptoms. On black cherry, the symptoms appeared most frequently on older leaves on the lower part of the branch. Whole tree observations suggested that most frequency on older leaves occurred on the inside of the lower parts of the crown; black cherry proved to be the most sensitive species. Indeed, on some trees, many leaves had already senesced and fallen to the ground by September 4. On symptomatic branches of black cherry, 13.1% of the leaves showed injury at Dickey Ridge, 29% at Big Meadows and 7.5% at Sawmill Run.;Injury was most frequently seen on the older leaves of yellow poplar, but ususally on branches at the outer crown. At Dickey Ridge, 35% of the leaves showed symptoms and at Big Meadows, 34.9%.;Sassafras trees sampled at Sawmill Run showed an average of 53.9% of the leaves on symptomatic branches with ozone induced injury.

For this study, were one or more specimens collected and removed from the park but not destroyed during analyses?
No

Funding provided this reporting year by NPS:	Funding provided this reporting year by other sources:
21488	0
Fill out the following ONLY IF the National Park Service supported this project in this reporting year by providing money to a university or college	
Full name of college or university:	**Annual funding provided by NPS to university or college this reporting year:**
PENN. STATE UNIVERSITY	5000